

**EnFilm™ - rechargeable solid state lithium thin film battery**

Datasheet – preliminary data

Features

- All solid-state
- Ultra thin
- Fast recharge
- Long cycle life
- RoHS compliant
- UL file number: MH47669

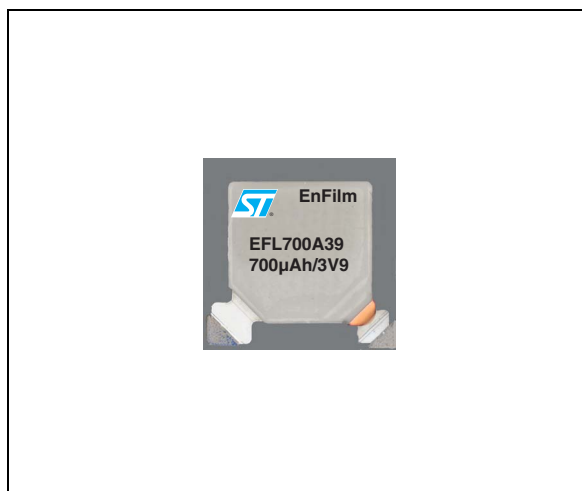
Applications

Device is intended to be used in following applications:

- Sensors and sensor networks
- Smart card
- RF ID tags
- Energy storage for energy harvesting devices
- Non implantable medical applications
- Backup power

Description

The EFL700A39 is a thin film rechargeable lithium battery. The battery has a LiCoO_2 cathode, LiPON ceramic electrolyte and a lithium anode. This device has a footprint of 25.4 x 25.4 mm.

**Table 1. Device summary**

Symbol	Value
Capacity	0.7 mAh
V_{nominal}	3.9 V
V_{op}	3.6 to 4.2 V
R_{int}	100 ohm
I_{p}	10 mA
Dimension	25.4 x 25.4 mm
Thickness	200 μm

TM: EnFilm is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings

Symbol	Parameter	Value	Unit
V_{op}	Operating voltage	3.6 – 4.2	V
I_c	Maximum continuous discharge current	5	mA
I_p	Maximum pulsed discharge current ⁽¹⁾	10	mA
T_{stg}	Storage temperature range	- 40 to 60	°C
T_{op}	Operating temperature range ⁽²⁾	- 40 to 60	°C
C_{life}	Cycle life (to minimum of 80% of initial capacity) ⁽³⁾	1000	cycle

1. Pulsing conditions: 100 ms on, 0.9 s off

2. 1/100 C discharge at -40 °C: operating at 60 °C reduces the cycle life

3. 1C discharge rate: 50% depth of discharge, cycle at room temperature

Table 3. Electrical characteristics

Symbol	Parameter		Test conditions	Min	Typ	Max	Unit
C	Nominal capacity (minimum)		T = 30 °C Discharge @ 1 mA Cut-off voltage = 3.6 V	0.7	-	-	mAh
R_{int}	Internal resistance		T = 30 °C	-	100	120	ohm
C_t	Charge time to 80% of full capacity		Constant voltage = 4.2 V	-	-	20	mn
S_{Disch}	Self discharge	total self discharge (recoverable and non-recoverable)	Room temperature	-	-	18	%/year
		non-recoverable	Room temperature	-	-	5	% first year
				-	-	15	% over 5 years

Figure 1. Typical discharge curve

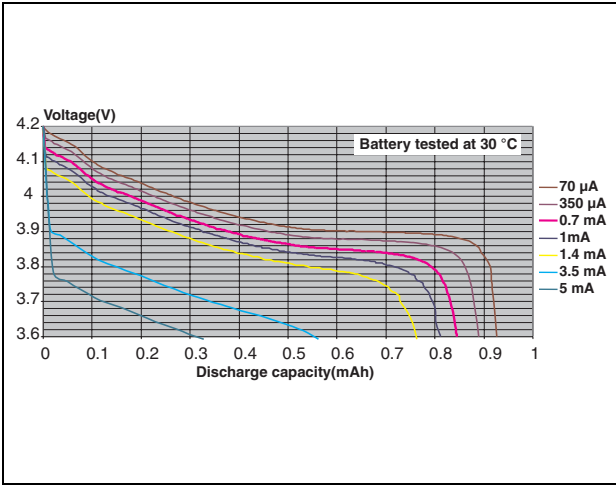


Figure 2. Typical pulsed discharge curve

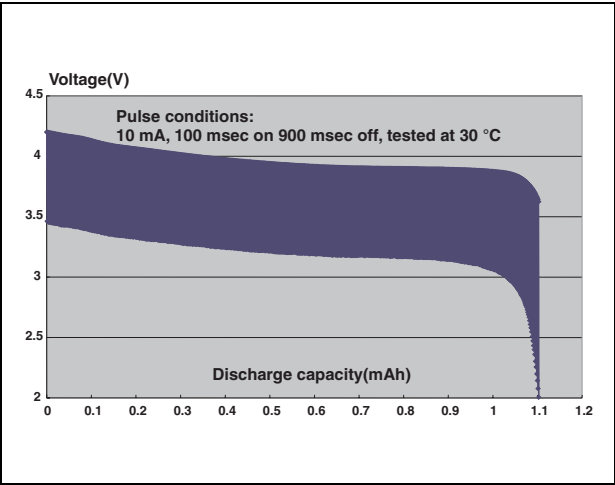
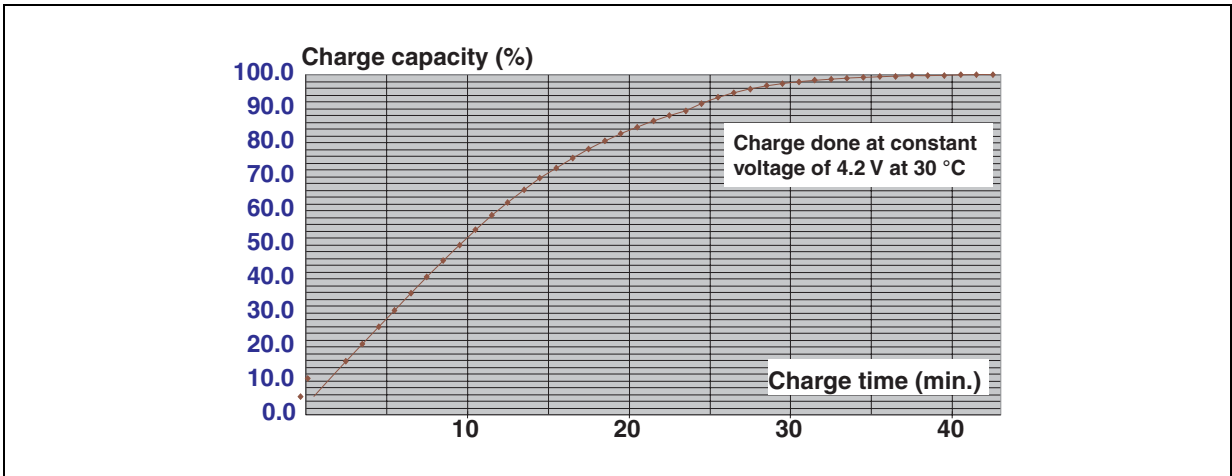


Figure 3. Typical charge curve



2 Application information

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3 Recommended charge and discharge processes

3.1 Charge

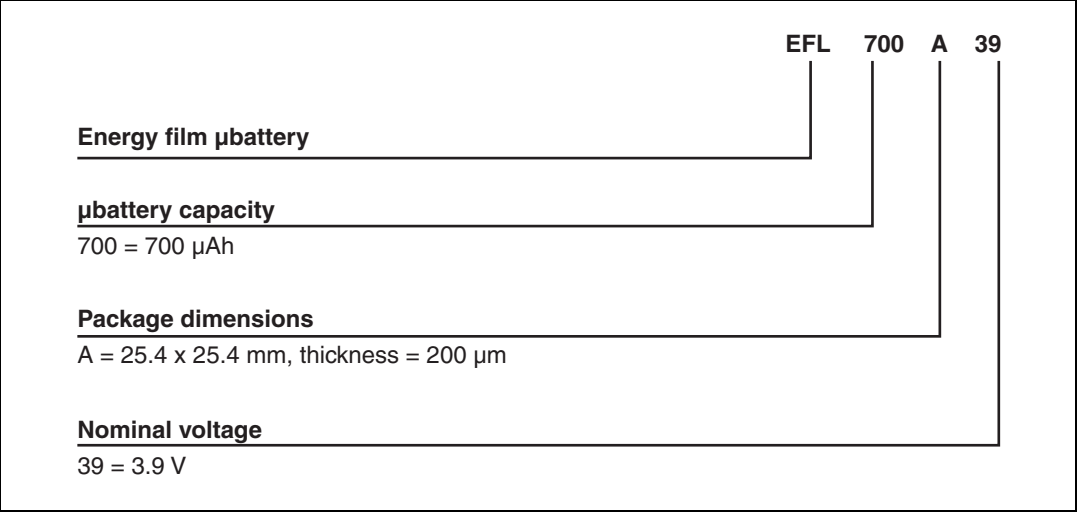
Battery can be charged from a $4.2\text{ V} \pm 0.05\text{ V}$ constant voltage source with or without current limit. More than 90% of the total capacity is recharged when the charge current falls below 0.1 mA.

3.2 Discharge

When discharging under constant current or constant load, the cut-off voltage should be no less than 3.6 V. Cut-off voltage can be lowered to 2.0 V for pulsed discharge.

4 Ordering information scheme

Figure 4. Ordering information scheme



5 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 5. Package dimensions

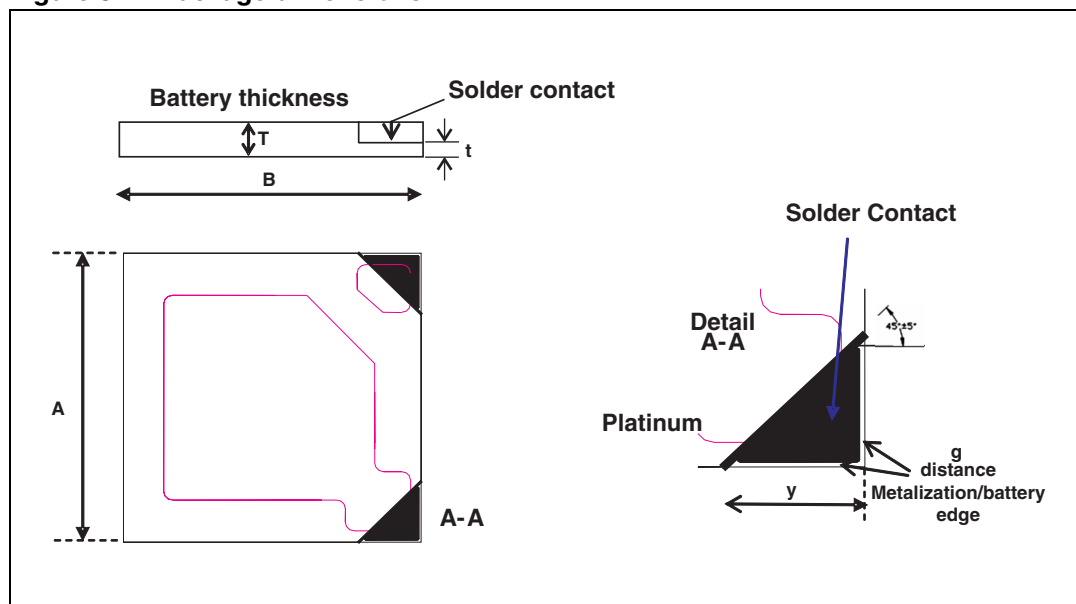


Table 4. Package dimensions

Ref	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	25.2	25.4	25.7	0.992	1.000	1.012
B	25.4	25.4	25.7	1.000	1.000	1.012
T	-	0.16	0.2	-	0.006	0.008
t	-	0.07	-	-	0.003	-
y	5.3	-	5.9	0.209	-	0.232
g	-	0.3	-	-	0.012	-

6 Recommendations for the soldering process

Refer to the STMicroelectronics Application note AN4046, “EnFilm™ micro battery EFL700A39, recommendations for manual assembly on PCB”.

7 Ordering information

Table 5. Ordering information

Order code	Marking	Weight	Base qty	Delivery mode
EFL700A39	EFL700A39	0.2 g	1	Individual packing

8 Revision history

Table 6. Document revision history

Date	Revision	Changes
08-Apr-2010	1	Initial release.
23-Apr-2012	2	Insert AN4046 reference for recommendations for the soldering process and update Figure 5 .

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